North Carolina
DEPARTMENT OF TRANSPORTATION

Status of Structurally Deficient & Functionally Obsolete Bridges

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Federal Definitions

A bridge is considered Structurally Deficient (SD) if it is in relatively poor condition, or has insufficient load-carrying capacity.

A bridge is considered Functionally Obsolete (FO) if it does not meet current and future traffic needs. This can include geometric or load-carrying capacity inadequacies.

SD

FO

Why are Structurally Deficient bridges of more concern?

Maintenance Costs – Significant for SD Bridges

System Reliability – Weight restrictions more likely with SD, also more lane closures for heavy maintenance activities

Safety – If a bridge is open it is safe, but SD bridges are closer to end of life

SD: 10 States with the Most State Owned Bridges

RANK	STATE	% SD	BRIDGES OWNED
1	Texas	0.9	20,220
2	Ohio	3.9	10,151
3	California	7.7	11,338
4	Illinois	7.9	6,636
5	Virginia	9.1	9,173
6	New York	10.4	7,550
7	S. Carolina	11.4	7,339
8	Missouri	14.3	7,197
9	**N. Carolina**	**16.4**	**12,493**
10	Pennsylvania	23.8	14,513

Average SD for all states is 7.6%

Median SD for the 10 states shown is 10%

SD counts exceed 10% in 78 of 100 NC Counties

Handout shows number of SD bridges in each county, as well as associated costs

Condition Ratings

National Bridge Inspection Standards (NBIS)

Code	Description
9	Excellent Condition
8	Very Good Condition
7	Good Condition
6	Satisfactory Condition
5	Fair Condition – *primary structural elements sound, minor section loss, deterioration or cracking*
4	Poor Condition – *advanced section loss, deterioration or spalling*
3	Serious Condition
2	Critical Condition
1	"Imminent" Failure Condition
0	Failed Condition

SD

SD: Bridge Decks

(279 of 2,167 occurrences in NC)

NBIS Condition Rating = 4

SD- Beams and Girders

(719 of 2,167 occurrences in NC)

NBIS Condition Rating = 4

1,310 SD Bridges are posted, 516 Bridges with SV $\leq$ 18 tons

SD- Pilings, Columns, Caps

(1,500 of 2,167 occurrences in NC)

NBIS Condition Rating = 4

FO: 10 States with the Most State Owned Bridges

RANK	STATE	% FO	BRIDGES OWNED
1	South Carolina	9.7%	7,339
2	Illinois	15.0%	6,636
3	Missouri	15.1%	7,197
4	Texas	16.7%	20,220
5	California	19.3%	11,338
6	Pennsylvania	21.3%	14,513
7	Virginia	21.6%	9,173
8	Ohio	22.0%	10,151
9	**N. Carolina**	**23.4%**	**12,493**
10	New York	34.7%	7,550

Average FO for all states is 19.8%

Median SD for the 10 states shown is 20.3%

Clear width between curbs accounts for 77% of all FO bridges in North Carolina

Condition Ratings

National Bridge Inspection Standards (NBIS)

	Code	Description
May be FO	9	Excellent Condition
	8	Very Good Condition
	7	Good Condition
	6	Satisfactory Condition
	5	Fair Condition - *primary structural elements sound, minor section loss, deterioration or cracking*
SD	4	Poor Condition – *advanced section loss, deterioration or spalling*
	3	Serious Condition
	2	Critical Condition
	1	"Imminent" Failure Condition
	0	Failed Condition

Functionally Obsolete

(3,155 FO bridges in NC)

Inadequacies that can cause a bridge to be FO:

- Deck Geometry
- Under-clearances
- Approach Roadway Alignment
- Structural Evaluation (a conservative measure of vehicle load carrying capacity)

FO: Deck Geometry

(2,424 of 3,155 occurrences in NC)

Insufficient deck roadway width

FO: Under-clearances

(483 of 3,155 occurrences in NC)

Insufficient vertical or horizontal clearances under bridge

FO: Approach Roadway Alignment

(87 of 3,155 occurrences in NC)

Speed reduction needed to cross bridge

FO: Structural Evaluation

(510 of 3,155 occurrences in NC)

Load capacity below criteria of standards

382 FO Bridges are posted, 185 Bridges with SV ≤ 18 tons

Why do we need to focus on SD Bridges?

- Maintenance costs
- Reliability
- Closer to end of useful life
- Federal performance metric (MAP-21 requirement that SD on National Highway System (NHS) must be no greater than 10%)

Long Term Goals

	GOAL	NOW
INTERSTATE	2%	4%
PRIMARY	6%	9%
SECONDARY	15%	21%
TOTAL	10%	16%

Statewide Target

SD 10%

Scenarios to Achieve 10% SD

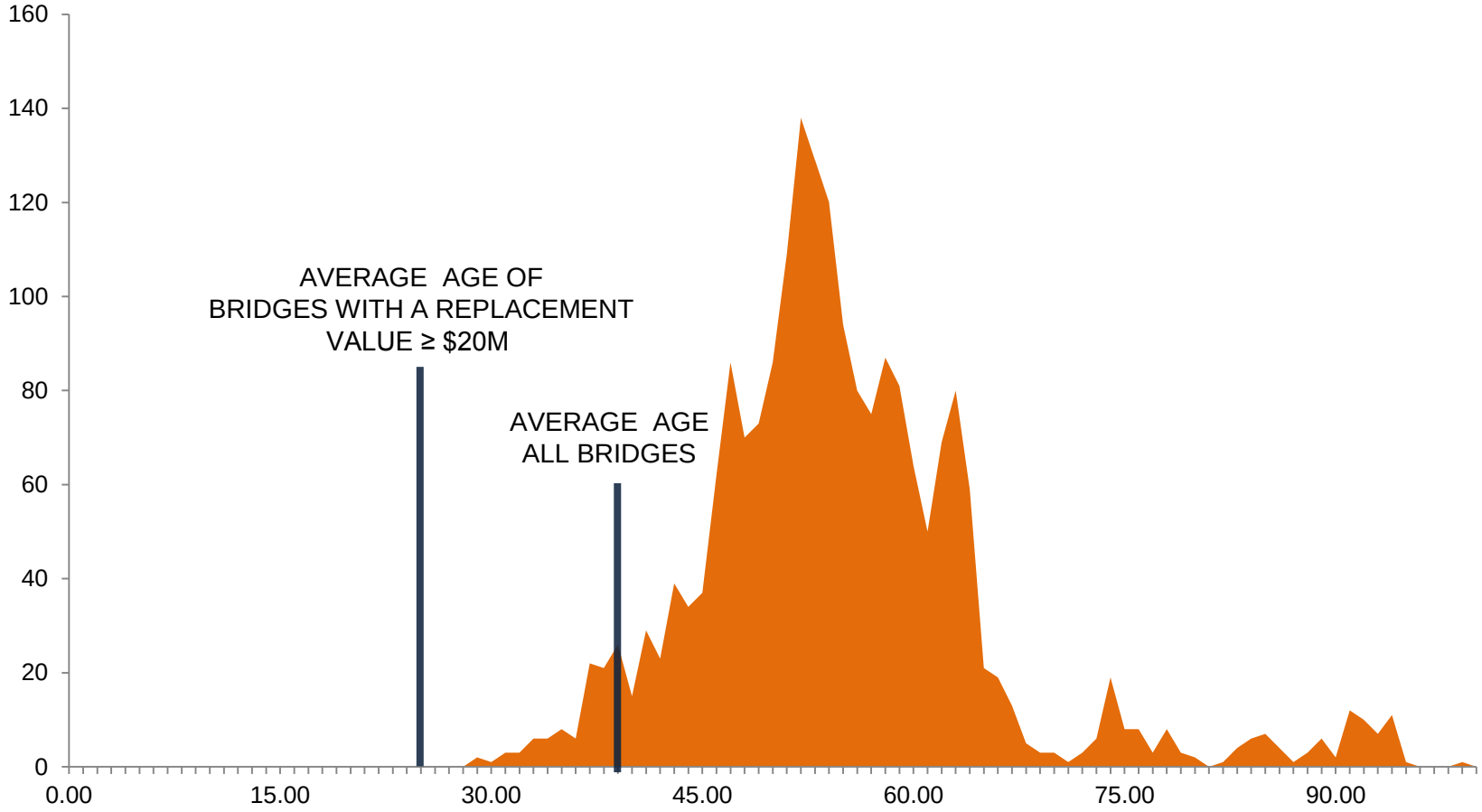
CURRENT BRIDGE PROGRAM (BP) FUNDING	**$160** Million Annually (+/-)
MAINTAIN **16% SD**	**$200** Million Annually
10% SD IN **7 Years**	**$325** Million Annually
10% SD IN **10 Years**	**$275** Million Annually
10% SD IN **15 Years**	**$250** Million Annually

Current Statutory Language

RENAME AND REDIRECT TAX PROCEEDS OF SYSTEM PRESERVATION PROGRAM

SECTION 34.18.(a) The Department of Transportation shall rename the "system preservation program" (fund center 1500/157839) the "bridge program." Funds allocated to this program shall be used for improvements to structurally deficient and functionally obsolete bridges. All projects funded under this program, with the exception of inspection, pre-engineering, contract preparation, contract administration and oversight, and planning activities, shall be outsourced to private contractors.

Number of Structurally Deficient Bridges By Age



Current Projections

Current Bridge Inventory Data suggests system aging will bring **250 NEW SD BRIDGES EACH YEAR**.

As of November 1, approximately 220 bridges became SD during 2014.

Yet, multiple year funds are committed for only **308 SD Bridges**.

Significant progress won't be made until we overcome the annual 250 and lessen the 1,869.

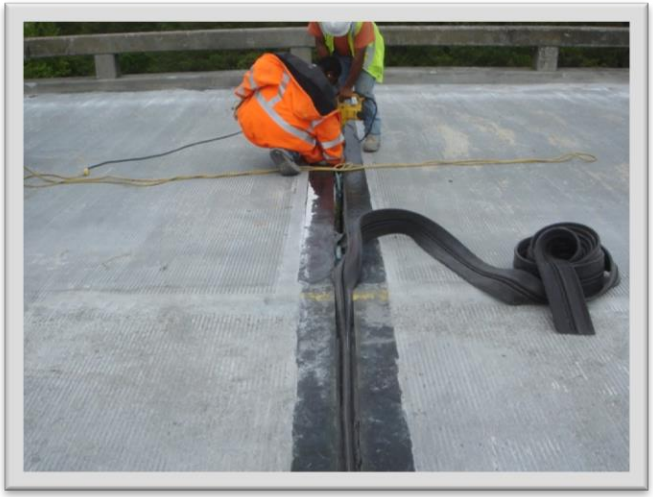
Reducing Future Costs

Benefits of Sound Bridge Preservation and Rehabilitation:

- Slow the rate of deterioration
- Extend service life and decrease life cycle costs
- Reduce rate of new SD bridges

Estimated funds needed to perform preservation and rehabilitation of sound bridges is **$60 Million Annually**

Benefits of Preservation and Rehabilitation



Fairview Road over Capital Blvd, Wake County, Built in 1960

Est. Replacement Cost: $3.7 M

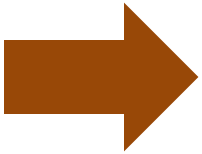
Actual Rehabilitation Cost: $675,000

Est. Benefit: 40 to 50 years of good service.

Spend ratio: $1 today v. $5 tomorrow

Bridges with a Replacement Cost ≥ $20M

185 BRIDGES
1.4% OF INVENTORY



$9 BILLION
16% OF ASSETS

COMPARED TO: THE 8,200+ BRIDGES ON THE SECONDARY SYSTEM MAKE UP 20% OF VALUE

Benefits of Preservation and Rehabilitation

Several of our High Value Bridges are on the verge of becoming SD.

Timely rehabilitation on a few of these structures could significantly extend the service life of a set of bridges worth hundreds of millions.

US 158 Wright Memorial Bridge over the Currituck Sound, Currituck County, Built in 1966

2.8 Miles long

Est. Replacement Cost: $200 M

Est. Rehabilitation Cost: $24 M

Est. Benefit: 40 to 50 years of good service

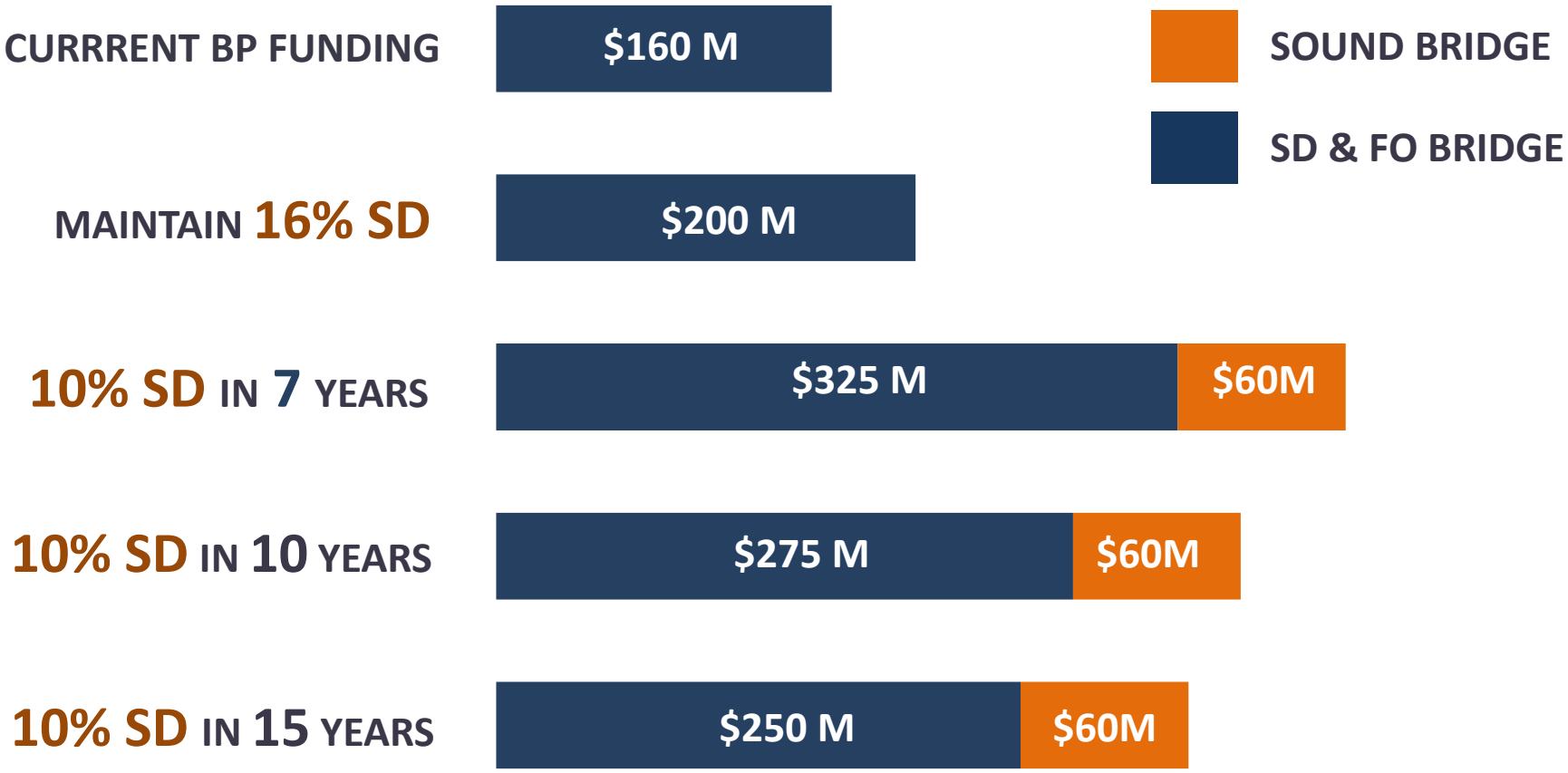
Spend Ratio: $1 today v. $8 tomorrow

Proposed Statutory Language

RENAME AND REDIRECT TAX PROCEEDS OF SYSTEM PRESERVATION PROGRAM

SECTION 34.18.(a) The Department of Transportation shall rename the "system preservation program" (fund center 1500/157839) the "bridge program." Funds allocated to this program shall be used for improvements to structurally deficient and functionally obsolete bridges, or to preserve structurally sound bridges. All projects funded under this program, with the exception of inspection, pre-engineering, contract preparation, contract administration and oversight, and planning activities, shall be outsourced to private contractors.

Combined BP Funding Scenarios



Summary

- Success of Bridge Program
- NC's SD Bridge Numbers Remain High
- Goal 10% SD
- ⬇ STI Funds, ⬆ HF Funds
- Preservation (especially high value assets)
- Flexibility in Bridge Program (statutory language)

QUESTIONS?